Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) Apparatus for transferring information within a cellular network, comprising:

a base-station transceiver system (BTS) (24A) positioned at a first location, that receives a composite down-link information signal containing information for a plurality of mobile transceivers and that transmits a composite up-link information signal containing information from a plurality of mobile transceivers which comprises:

communication control circuitry (25A), adapted to receive the composite down-link information signal and to generate a composite down-link radio-frequency (RF) signals receivable by a plurality of mobile cellular transceivers (48) operative within the cellular network, and to process composite up-link RF signals transmitted, by the mobile cellular transceivers; and

first transducer circuitry (27A), adapted to modulate a first beam of unguided optical radiation with the composite down-link RF signals and to radiate the modulated beam as a first modulated optical beam, and to receive and demodulate a second modulated beam of unguided optical radiation so as to recover the composite up-link RF signals; and

an antenna assembly (26A), positioned at a second location remote from the first location, which comprises:

second transducer circuitry (29A), adapted to modulate ~~a~~ the second beam of unguided optical radiation with the composite up-link RF signals, using analog modulation, and to radiate the modulated beam as the second modulated optical beam to the BTS, and to receive and demodulate the first modulated beam of unguided optical radiation from the BTS so as to recover the composite down-link RF signals; and

an antenna (31A), adapted to radiate the recovered composite down-link RF signals to the mobile cellular transceiver and to receive the composite up-link RF signals from the mobile cellular transceiver.

2. (Previously presented) Apparatus according to claim 1, wherein the first and the second transducer circuitry are adapted to radiate the first modulated optical beam and the second modulated optical beam via a path between the BTS and the antenna comprising free space.

3. (Previously presented) Apparatus according to claim 1, wherein at least one of the first and second transducer circuitry comprises a laser which transmits coherent optical radiation as the unguided optical radiation between the BTS and the antenna.

4. (Previously presented) Apparatus according to claim 1, wherein at least one of the first and second transducer circuitry comprises at least one emitter which transmits incoherent optical radiation as the unguided optical radiation between the BTS and the antenna.

5. (Original) Apparatus according to claim 1, wherein the first location is separated from the second location by a distance chosen from a range between approximately 10 m and approximately 700 m.

6. (Original) Apparatus according to claim 1, wherein at least one of the first and second beams comprises electromagnetic radiation having a wavelength chosen from a range between approximately 0.3 μm and approximately 30 μm.

7. (Cancelled)

8. (Previously presented) Apparatus according to claim 1, and comprising a switching center which is adapted to generate the information responsive to the composite up-link and down-link signals and to transfer the information between the BTS and at least one communication system chosen from a group comprising a public switched telephone network

(PSTN), a distributed packet transfer network, a satellite communications system, and a second cellular network.

9. (Original) Apparatus according to claim 1, and comprising a base-station controller (BSC) which controls the BTS.

10. (Previously presented) Apparatus according to claim 1, wherein at least one of the composite down-link RF signals and the composite up-link RF signals comprise a plurality of separate RF signals.

11. (Previously presented) Apparatus according to claim 1, wherein the first transducer circuitry comprises an analog-to-digital converter which is adapted to digitize the composite down-link RF signals so as to generate down-link digitized signals, and wherein the second transducer circuitry comprises a digital-to-analog converter which is adapted to recover the composite down-link RF signals from the down-link digitized signals.

12. (Original) Apparatus according to claim 11, wherein the first transducer circuitry is adapted to compress the down-link digitized signals so as to generate compressed down-link digital signals, and wherein the second transducer circuitry is adapted to decompress the compressed down-link digital signals so as to recover the down-link digitized signals.

13. (Previously presented) Apparatus according to claim 1, wherein the second transducer circuitry comprises an analog-to-digital converter which is adapted to digitize the composite up-link RF signals so as to generate up-link digitized signals, and wherein the first transducer circuitry comprises a digital-to-analog converter which is adapted to recover the composite up-link RF signals from the up-link digitized signals.

14. (Original) Apparatus according to claim 13, wherein the second transducer circuitry is adapted to compress the up-link digitized signals so as to generate compressed up-link digital signals, and wherein the second transducer circuitry is adapted to decompress the compressed

up-link digital signals so as to recover the up-link digitized signals.

15. (Currently amended) A method for transferring information within a cellular network, comprising:

positioning a base-station transceiver system (BTS) at a first location;

generating in communication control circuitry (25A) comprised in the BTS composite down-link radio-frequency (RF) signals receivable by a plurality of mobile cellular transceivers (48) operative within the cellular network;

modulating a first beam of unguided optical radiation with the composite down-link RF signals in first transducer circuitry (27A) comprised in the BTS, so as to form a first modulated optical beam;

radiating the first modulated optical beam from the first transducer circuitry;

receiving and demodulating a second modulated beam of unguided optical radiation in the first transducer circuitry so as to recover the composite up-link RF signals transmitted by the mobile cellular transceivers;

processing the composite up-link RF signals in the communication control circuitry;

positioning an antenna assembly (26A) at a second location remote from the first location;

receiving in an antenna (31A) comprised in the antenna assembly the composite up-link RF signals from the mobile cellular transceiver;

modulating a second beam of unguided optical radiation with the composite up-link RF signals <u>using analog modulation</u> in second transducer circuitry (29A) comprised in the antenna assembly, so as to form the second modulated optical beam;

radiating the second modulated optical beam from the second transducer circuitry to the BTS;

receiving and demodulating in the second transducer circuitry the first modulated optical beam from the first transducer circuitry so as to recover the composite down-link RF signals; and

radiating the recovered composite down-link RF signals from the antenna to the mobile cellular transceivers.

16. (Previously presented) A method according to claim 15, wherein radiating the first modulated optical beam and radiating the second modulated optical beam comprises radiating the first and second optical beams via a path between the BTS and the antenna comprising free space.

17. (Previously presented) A method according to claim 15, and comprising providing at least one laser which transmits coherent optical radiation as the unguided optical radiation between the BTS and the antenna.

18. (Previously presented) A method according to claim 15, and comprising providing at least one emitter which transmits incoherent optical radiation as the unguided optical radiation between the BTS and the antenna.

19. (Original) A method according to claim 15, wherein the first location is separated from the second location by a distance chosen from a range between approximately 10 m and approximately 700 m.

20. (Previously presented) A method according to claim 15, wherein at least one of the first and second beams comprises optical radiation having a wavelength chosen from a range between approximately 0.3 μm and approximately 30 μm.

21. (Cancelled)

22. (Previously presented) A method according to claim 15, and comprising a switch center for generating the information responsive to the composite up-link and composite down-link signals and transferring the information between the BTS and at least one communication system chosen from a group comprising a public switched telephone network (PSTN), a distributed packet transfer network, a satellite communications system, and a second cellular

network.

23. (Cancelled)

24. (Previously presented) A method according to claim 15, wherein at least one of the composite down-link RF signals and the composite up-link RF signals comprise a plurality of separate RF signals.

25. (Previously presented) A method according to claim 15, and comprising:

digitizing the composite down-link RF signals in an analog-to-digital converter comprised in the first transducer circuitry so as to generate down-link digitized signals, and

recovering the composite down-link RF signals from the down-link digitized signals in a digital-to-analog converter comprised in the second transducer circuitry.

26. (Previously presented) A method according to claim 25, and comprising:

compressing the down-link digitized signals in the first transducer circuitry so as to generate compressed down-link digital signals; and

decompressing the compressed down-link digital signals in the second transducer circuitry so as to recover the down-link digitized signals.

27. (Previously presented) A method according to claim 15, and comprising:

digitizing the composite up-link RF signals in an analog-to-digital converter comprised in the second transducer circuitry so as to generate up-link digitized signals, and

recovering the composite up-link RF signals from the up-link digitized signals in a digital-to-analog converter comprised in the first transducer circuitry.

28. (Previously presented) A method according to claim 27, and comprising:

compressing the up-link digitized signals in the second transducer circuitry so as to generate compressed up-link digital signals; and decompressing the compressed up-link digital

signals in the first transducer circuitry so as to recover the up-link digitized signals.

29. (Previously presented) The apparatus according to claim 1, wherein the communication control circuitry is disposed solely within the base-station transceiver system.

30. (Previously presented) The apparatus according to claim 1, wherein there is one base-station transceiver system for each remote antenna assembly.

31. (Previously presented) The method according to claim 15, further comprising providing the communication control circuitry solely within the BTS.

32. (Previously presented) The method according to claim 15, further comprising providing one BTS per antenna assembly.

33. (Previously presented) Apparatus as claimed in claim 1, wherein the BTS further comprises an antenna adapted to radiate the composite down-link RF signals to the mobile transceivers and to receive the composite up-link RF signals from the mobile cellular transceivers with a coverage area of the BTS.

34. (Previously presented) Apparatus of claim 33, wherein the second location is outside of the coverage area of the BTS at the first location.

35. (Previously presented) The method according to claim 15, further comprising radiating with the BTS the composite down-link RF signals to mobile transceivers within a coverage area of the BTS and receive composite up-link signals from the mobile transceivers with the coverage area.

36. (Previously presented) The method of claim 35, wherein the act of positioning the antenna assembly at the second location comprises positioning the antenna assembly outside of the coverage area of the BTS.

37. (New) A distributed cellular base station, comprising:

an antenna assembly comprising:

an antenna adapted to receive RF signals from mobile stations;

a beam generator adapted to modulate RF signals received by the antenna onto a data carrying light beam, at least partially using analog modulation; and

optics adapted to transmit the light beam from the beam generator through free space; and

a base station assembly comprising:

a transducer adapted to convert an optical beam from free space from the antenna assembly into an electric signal; and

communication control circuitry of a base transmission station (BTS) adapted to handle the electric signals from the transducer in accordance with cellular network methods.

38. (New) A distributed cellular base station according to claim 37, wherein the beam generator of the antenna assembly is adapted to generate a light beam which is only analog modulated with the RF signals received by the antenna.

39. (New) A distributed cellular base station according to claim 37, wherein the beam generator of the antenna assembly is adapted to generate a light beam which is modulated by a combination of analog and digital modulation with the RF signals received by the antenna.

40. (New) A distributed cellular base station according to claim 37, wherein the beam generator comprises a laser.

41. (New) A distributed cellular base station according to claim 37, wherein the beam generator comprises a source of incoherent optical radiation.

42. (New) A distributed cellular base station according to claim 37, wherein the beam generator is adapted to modulate the RF signals onto the light beam using amplitude modulation.

43. (New) A distributed cellular base station according to claim 37, wherein the beam generator is adapted to modulate the RF signals onto the light beam using frequency modulation.

44. (New) A distributed cellular base station according to claim 37, wherein the beam generator is adapted to modulate the RF signals onto the light beam using phase or polarization modulation.

45. (New) A distributed cellular base station according to claim 37, wherein the beam generator is adapted to modulate the RF signals onto the light beam using a combination of two or more of amplitude modulation, frequency modulation, phase modulation and polarization modulation.

46. (New) A distributed cellular base station according to claim 37, comprising a combiner adapted to add control or status information to the RF signals modulated onto the light beam.